

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

(12) UK Patent Application (19) GB (11) 2 319 170 (13) A

(43) Date of A Publication 20.05.1998

(21) Application No 9802444.1

(22) Date of Filing 11.05.1994

Date Lodged 04.02.1998

(62) Divided from Application No 9409398.6 under Section 15(4) of the Patents Act 1977

(71) Applicant(s)
Chi Hung Chan
Flat E 2nd Floor, Yau Hong Court, Lei King Wan,
Hong Kong

(72) Inventor(s)
Chi Hung Chan

(74) Agent and/or Address for Service
Lloyd Wise, Tregear & Co
Commonwealth House, 1-19 New Oxford Street,
LONDON, WC1A 1LW, United Kingdom

(51) INT CL⁶
A61C 17/26 , A46B 7/08

(52) UK CL (Edition P)
A4K KBC
U1S S1125

(56) Documents Cited
GB 2247298 A US 4471504 A US 4397055 A
US 4335480 A US 4313237 A

(58) Field of Search
UK CL (Edition O) A4K
INT CL⁶ A46B , A61C

(54) Power-driven toothbrush

(57) The removable head 100 of a driven toothbrush has brush heads 210, 220 rotated via gears 170, 180, 190, by shaft 140, 165 which connects at one end 142 to the motor handle. The shaft has telescoping, rotation-transmitting parts 144, 160 which are biased by spring 150 to allow the shaft to retract upon connection of the head to the handle.

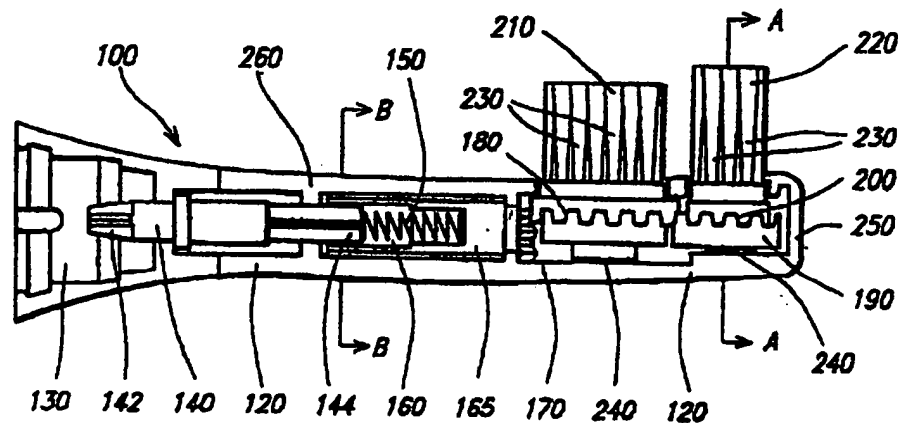


FIG.1

GB 2 319 170 A

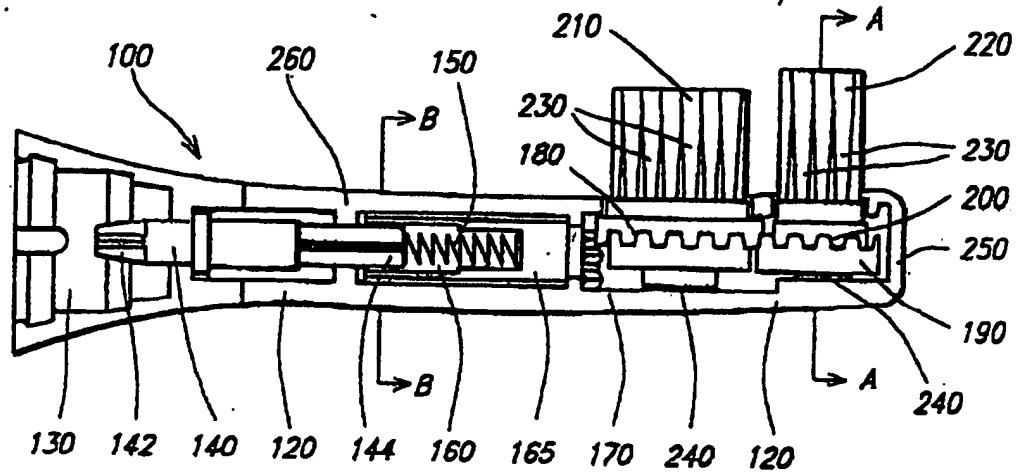


FIG. 1

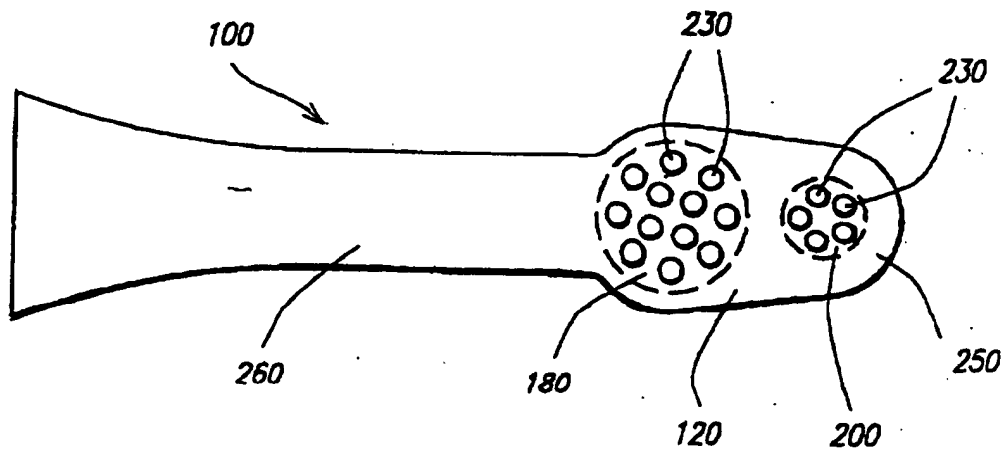
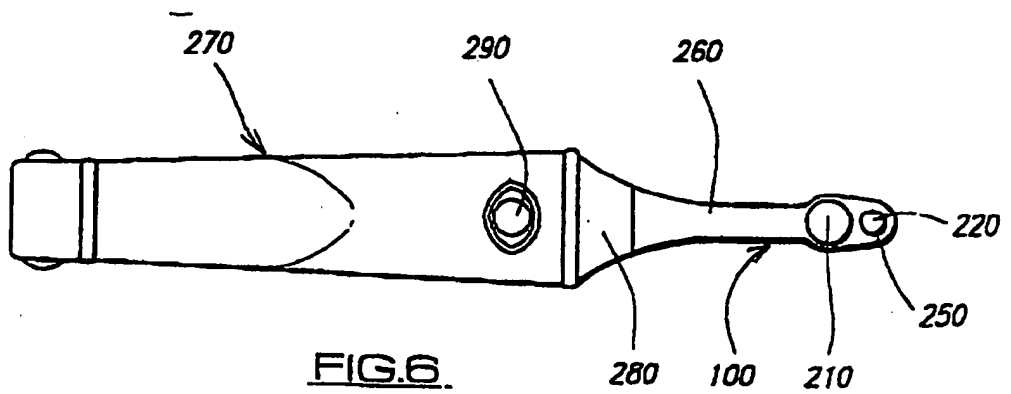
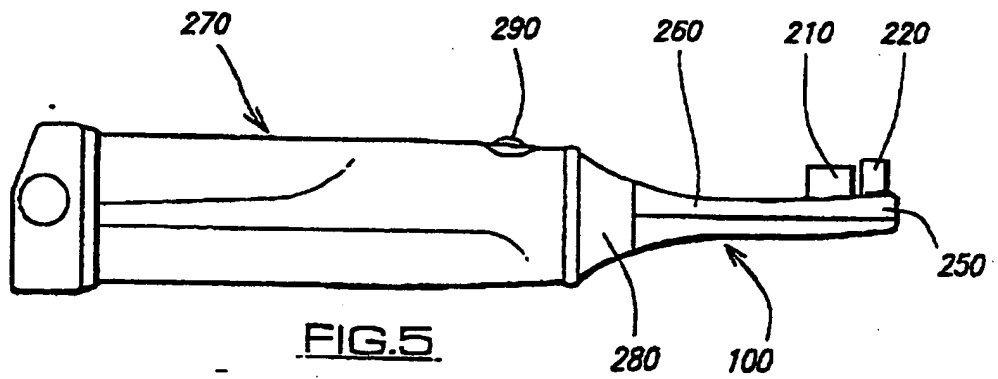
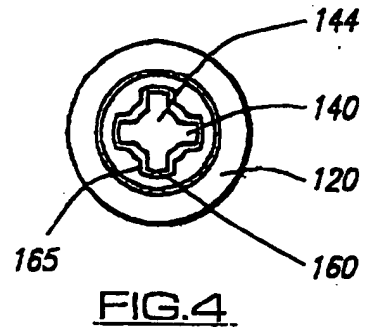
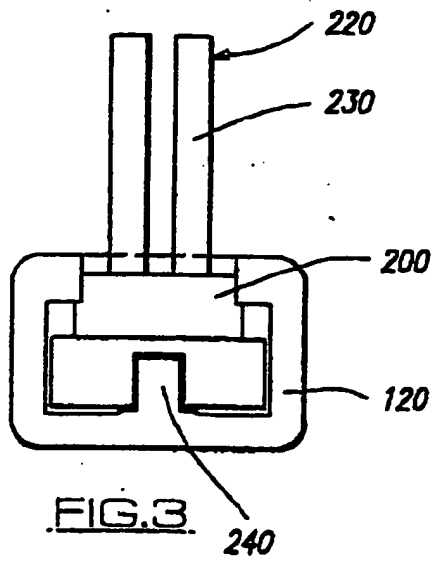


FIG. 2



POWER-DRIVEN TOOTHBRUSHES

This invention relates to a brush head for a toothbrush and to a toothbrush. More particularly, this invention relates to a power-driven brush head and a power-driven toothbrush having an improved teeth cleaning capability.

This application is divided from applicants prior UK patent application published under No. 2290224.

Known power-driven toothbrushes have the disadvantage that they are complicated in construction and do not effectively clean the teeth and gums.

An object of this invention is to overcome the above disadvantages or difficulties or at least to provide the public with a useful choice.

Accordingly, this invention comprises a brush head for a power-driven toothbrush comprising at least two rotatable brush members having a plurality of bristle tufts, and gear means for connection to a drive means for driving the brush members in rotation including a rotatable shaft which comprises first and second shaft parts engaged with each other in the rotational direction, the first shaft part being movable relative to the second in the axial

direction.

The first shaft part is preferably slidably receivable within a recess in the second shaft part.

5

The brush head preferably includes resilient means to urge the first shaft part out of the recess in the second shaft part.

10

In a further aspect the invention comprises a power-driven toothbrush comprising a brush head as defined above, and a handle containing drive means connected to the gear means.

15

Preferred embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

20

Figure 1: is a side view of a brush head of a preferred embodiment of a toothbrush of the invention with the cover cutaway.

25

Figure 2: is an underneath view of a brush head of a preferred embodiment of a toothbrush of the invention showing the positions of bristle tufts in ghost lines.

Figure 3: is a cross-section through line A-A of figure 1.

Figure 4: is a cross-section through line B-B of figure 1.

5 Figure 5: is a side view of a preferred embodiment of a power-driven toothbrush of the invention.

Figure 6: is a top view of a preferred embodiment of a power-driven toothbrush of the invention.

10

Referring to figures 1 and 2, a preferred embodiment of the brush head of the invention is indicated generally at 100. The brush head has a casing 120 which is preferably formed in two halves for ease of assembly. Within the casing is
15 formed a socket 130 for receiving a drive means enclosed with the toothbrush body shown in figures 4 and 5. Received by the drive means is a drive shaft 140 with a first end 142 which cooperates with the drive means so that the drive means may transmit torque to the drive shaft. To
20 facilitate efficient torque transmission, the end 142 of the drive shaft 140 is of cruciform shape and is received by a similar shaped recess in the drive means.

The drive shaft transmits torque to a drive gear 170 having
25 a gear shaft 165. The gear shaft 165 comprises a drive shaft receiving recess 160, which receives a second end 144

of the drive shaft (see figure 4). Again to facilitate efficient torque transmission, the second end 165 of the drive shaft 140 is also of cruciform shape, and the recess 160 is of a similar, cooperating shape.

5

In order to avoid damage to the drive shaft 140 during insertion into a recess in the drive means, a spring 150 is provided. The spring 150 allows the drive shaft 140 limited axial movement and this prevents the drive shaft
10 from snapping, if incorrectly inserted in the drive means.

The drive gear 170 has a plurality of annularly spaced teeth, preferably bevelled, which mesh with similarly shaped and spaced teeth on a first crown gear 180.

15

The teeth on the first crown gear 180 in turn mesh with similarly shaped and spaced teeth on a second crown gear 190. The two crown gears 180, 190 are rotatably mounted on guide pins 240 in the casing 120. Thus, torque produced by
20 a drive means may be transmitted via drive shaft 140, gear shaft 165 and drive gear 170 to crown gears 180 and 190, thus rotating the gears 180, 190.

Crown gears 180, 190 each form part of a base to which a
25 plurality of bristle tufts 230 are secured to form brush members 210, 220. The bristle tufts extend through

suitable apertures in the casing 120 (see figure 3).

Rotation of the gears 180, 190 therefore causes brush members 210, 220 to rotate. The arrangement of gears depicted in figure 1 results in contra-rotation of the two brush members. This contra-rotation provides for efficient brushing of the teeth and gums.

The bristles tufts 230 are preferably arranged in such a way that the brush members 210, 220 have a circular base and, preferably, are cylindrical in shape.

In order to facilitate cleaning of the teeth and gums, especially those at the back of the mouth, the brush head 100 is tapered at one end 250. The brush member 220 positioned at the tapered end 250 of the head 100 is smaller in diameter than brush member 210, again to facilitate cleaning, especially towards the back of the mouth. The bristle tufts 230 of brush member 220 are preferably longer than those of member 210. The brush head 100 also preferably comprises a slim neck 260 to, among other things, reduce the bulk of material entering the mouth, and for aesthetic purposes.

Referring now to figures 5 and 6, in use the brush head 100 is connected to a handle 270 by any conventional means, and

the drive means in the handle is received by socket 130. The handle suitably has a tapered portion 280 and on/off switch or switches 290. The handle may contain batteries to power the drive means, or the drive means in the handle
5 may be connected by way of a lead extending through the handle, to a mains power supply, or both.

All the components in the toothbrush are suitably made of plastics or similar materials, apart from the spring which
10 is preferably formed of metal.

The above describes a preferred embodiment of the invention, variations and modifications in which may be made without departing from the scope of the invention as
15 defined in the accompanying claims.

There may be a plurality of brush members. Three brush members could be arranged in a triangular pattern, one smaller brush member being situated in the tapered end of
20 the toothbrush.

The casing may be of any suitable shape.

The brush members may be conical or any other suitable
25 shape.

The handle may be of any suitable configuration and may include indentations in the shape of a hand. There may be a plurality of switches provided, one of which may provide for reversing the direction of rotation of the brush members.

5

The gear means described is a simple and effective way of transferring torque from a drive means to the brush members. However, other conventional gear means may be employed as will be clear to one skilled in the art to which the invention relates. The ends of the drive shaft need not be of cruciform shape but may be of any shape which, when received by a similar shaped recesses, can transfer torque.

10

15

CLAIMS

1. A brush head for a power-driven toothbrush comprising
at least two rotatable brush members having a
5 plurality of bristle tufts, and gear means for
connection to a drive means for driving the brush
members in rotation including a rotatable shaft which
comprises first and second shaft parts engaged with
each other in the rotational direction, the first
10 shaft part being movable relative to the second in the
axial direction.
2. A brush head according to claim 1 wherein the first
shaft part is slidably receivable within a recess in
15 the second shaft part.
3. A brush head according to claim 2 including resilient
means to urge the first shaft part out of the recess
in the second shaft part.
- 20 4. A brush head as claimed in any of claims 1 to 3,
wherein the brush members can be continuously rotated
by the drive means.
- 25 5. A brush head as claimed in any one of claims 1 to 4,
wherein the brush head is tapered at one end.

6. A brush head as claimed in claim 5 wherein the brush member or members at the tapered end of the brush head is or are of reduced base width relative to the other member or members.

5

7. A brush head as claimed in any one of claims 1 to 6 wherein the brush members have a circular base.

10

8. A brush head as claimed in any of claims 1 to 7, wherein the brush members are of cylindrical shape.

15

9. A brush head as claimed in any one of claims 1 to 8, wherein the gear means further comprises a driving gear which meshes with a first crown gear associated with a first brush member which gear in turn meshes with a second crown gear associated with a second brush member.

20

10. A brush head as claimed in claim 6 wherein the brush member or members of reduced base width have longer bristles relative to the bristles of the other member or members.

25

11. A power-driven toothbrush comprising a brush head as claimed in any one of claims 1 to 10, and a handle containing a drive means connected to the gear means.

12. A brush head substantially as herein described with reference to any one of the accompanying drawings.
13. A power-driven tooth brush substantially as herein described with reference to Figure 5 or 6 of the accompanying drawings.



Application No: GB 9802444.1
Claims searched: 1-13

Examiner: G WERRETT
Date of search: 12 March 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A4K.

Int Cl (Ed.6): A46B, A61C.

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2247296 A (CHUNG)	1.
X	US 4471504 (BENGT)	1.
X	US 4397055 (SAMUEL)	1.
X	US 4335480 (LIU)	1.
X	US 4313237 (SMITH)	1.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.